Claims

1. An interface for providing thermal overload protection, comprising:

a switching device including a control terminal and a pair of output terminals, wherein the pair of output terminals are configured to provide a drive current to an inductive load responsive to a control signal on the control terminal;

a temperature indicating device located approximate the switching device, the temperature indicating device receiving a bias current and providing a temperature signal that provides an indication of a temperature of the switching device;

a drive circuit coupled to the control terminal of the switching device, the drive circuit providing the control signal at the control terminal of the switching device responsive to an external signal; and

a thermal monitoring circuit coupled across the temperature indicating device, the thermal monitoring circuit providing a shutdown signal to the drive circuit when the temperature of the switching device is above a predetermined temperature level as indicated by the temperature signal, wherein the drive circuit responds to the shutdown signal by removing current sources and current sinks from the control terminal of the switching device at which point leakage currents associated with the control terminal of the switching device cause the switching device to reduce the drive current to the inductive load.

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2. The interface of claim 1, wherein the temperature indicating device includes a plurality of serially coupled diodes.

3. The interface of claim 2, wherein the plurality of serially coupled diodes are polysilicon diodes.

4. The interface of claim 1, wherein the switching device is an insulated gate bipolar transistor (IGBT).

5. The interface of claim 1, wherein the temperature indicating device and the switching device are located on a monolithic integrated circuit, and wherein the temperature indicating device includes a plurality of serially coupled polysilicon diodes that are electrically isolated from active regions of the switching device.

6. The interface of claim 1, wherein each epitaxial region associated with the control terminal of the switching device includes a leakage current compensator.

7. The interface of claim 1, wherein the switching device is a field effect transistor (FET).

8. The interface of claim 1, wherein the temperature indicating device includes a plurality of serially coupled polysilicon diodes that are electrically isolated from active regions of the switching device and the switching device is an insulated gate bipolar transistor (IGBT).

9. A method for temperature based over-dwell termination without a spark, comprising the steps of:

receiving a signal that provides an indication of a temperature of a switching device, the switching device controlling an ignition coil current through an ignition coil that is coupled to a spark plug;

determining when the signal transitions through a predetermined threshold level, wherein the predetermined threshold level corresponds to an upper temperature limit; and

removing current sources and current sinks from the control terminal of the switching device when the signal transitions through the predetermined threshold level, wherein leakage currents associated with the

control terminal of the switching device cause the switching device to reduce the ignition coil current at a rate that prevents the spark plug from generating a spark.

10. The method of claim 9, wherein the temperature indicating device includes a plurality of serially coupled polysilicon diodes.

11. The method of claim 9, wherein the switching device is an insulated gate bipolar transistor (IGBT).

12. The method of claim 9, wherein the temperature indicating device and the switching device are located on a monolithic integrated circuit, and wherein the temperature indicating device includes a plurality of serially coupled polysilicon diodes that are electrically isolated from active regions of the switching device.

13. The method of claim 9, wherein each epitaxial region associated with the control terminal of the switching device includes a leakage current compensator.

14. The method of claim 9, wherein the switching device is a field effect transistor (FET).

15. The method of claim 9, wherein the temperature indicating device includes a plurality of serially coupled polysilicon diodes that are electrically isolated from active regions of the switching device and the switching device is an insulated gate bipolar transistor (IGBT).

16. An automotive ignition system including an interface for providing thermal overload protection, the interface comprising:

a switching device including a control terminal and a pair of output terminals, wherein the pair of output terminals are configured to

provide a drive current to an inductive load responsive to a control signal on the control terminal;

a temperature indicating device located approximate the switching device, the temperature indicating device receiving a bias current and providing a temperature signal that provides an indication of a temperature of the switching device;

a drive circuit coupled to the control terminal of the switching device, the drive circuit providing the control signal at the control terminal of the switching device responsive to an external signal; and

a thermal monitoring circuit coupled across the temperature indicating device, the thermal monitoring circuit providing a shutdown signal to the drive circuit when the temperature of the switching device is above a predetermined temperature level as indicated by the temperature signal, wherein the drive circuit responds to the shutdown signal by removing current sources and current sinks from the control terminal of the switching device at which point leakage currents associated with the control terminal of the switching device cause the switching device to reduce the drive current to the inductive load, and, wherein the switching device is an insulated gate bipolar transistor (IGBT).

17. The system of claim 16, wherein the temperature indicating device includes a plurality of serially coupled polysilicon diodes.

18. The system of claim 16, wherein the temperature indicating device and the switching device are located on a monolithic integrated circuit, and wherein the temperature indicating device includes a plurality of serially coupled polysilicon diodes that are electrically isolated from active regions of the switching device.

19. The system of claim 16, wherein each epitaxial region associated with the control terminal of the switching device includes a leakage current compensator.

20. The system of claim 16, wherein the inductive load is an automotive ignition coil.